Landslides: How do landslides cause tsunamis?

Tsunamis are large, potentially deadly and destructive sea waves, most of which are formed as a result of submarine earthquakes. They may also result from the eruption or collapse of island or coastal volcanoes and the formation of giant landslides on marine margins. These landslides, in turn, are often triggered by earthquakes. Tsunamis can be generated on impact as a rapidly moving landslide mass enters the water or as water displaces behind and ahead of a rapidly moving underwater landslide.

Many scientists believe that the 1998 tsunami, which killed thousands of people and destroyed coastal villages along the northern coast of Papua-New Guinea, was generated by a large underwater slump of sediments, triggered by an earthquake.

The 1964 Alaska earthquake caused 115 deaths in Alaska alone, with 106 of those due to tsunamis generated by tectonic uplift of the sea floor, and by localized subareal and submarine landslides. The earthquake shaking caused at least 5 local slide-generated tsunamis within minutes after the shaking began. For an eyewitness account of the tsunami caused by the movement and landslides of the 1964 Alaska earthquake, please see: http://www.npr.org/templates/story/story.php?storyId=5007860

Research in the Canary Islands concludes that there have been at least five massive volcano landslides that occurred in the past, and that similar large events may occur in the future. Giant landslides have the potential of generating large tsunami waves at close and also very great distances and would have the potential to devastate large areas of coastal land as far away as the eastern seaboard of North America.

Rock falls and rock avalanches in coastal inlets, such as those that have occurred in the past at Tidal Inlet, Glacier Bay National Park, Alaska, have the potential to cause regional tsunamis that pose a hazard to coastal ecosystems and human settlements. On July 9, 1958, a magnitude M 7.9 earthquake on the Fairweather Fault triggered a rock avalanche at the head of Lituya Bay, Alaska. The landslide generated a wave that ran up 524 m on the opposite shore and sent a 30-m high wave through Lituya Bay, sinking two of three fishing boats and killing two persons.

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